The Tech

2018 Year in Review

Dear readers,

There's a quote pasted on the wall of *The Tech*'s newsroom that reads, "Trying to determine what is going on in the world by reading newspapers is like trying to tell the time by watching the second hand of a clock." The news is a snapshot of the current moment in time — the events taking place and the way people feel about them.

The Tech's Year in Review is a look back on the past year of *The Tech*, and by extension, the MIT community. It's one attempt to know a bit more about what's going on in the world, by reminding us what happened in the past. As you look through the Year in Review, do you feel differently about any of the events we've highlighted? Do you understand anything differently?

We've covered a number of stories this year, some huge and historic, like the establishment of the College of Computing, or the Institute's ties with Saudi Arabia, and some smaller and more temporal but nevertheless of interest to the community, like IS&T's new spam filters or the appearance of coyotes on campus. We've also written about numerous student plays and artwork, the premiere of a professor's new opera, and an entrepreneurship competition inside a glass cube. We've interviewed MIT scientists in their labs, given out advice to lovelorn students, and published thoughtful letters from students, faculty, and alumni. And that's just to name a few.

However, as I reflect on my tenure as Editor in Chief, I can't help but consider all of the things I know we didn't cover — interviews that never worked out, events no one was available to write about, opinions that weren't expressed, or things that simply never crossed our desks or inboxes.

There's a "Calvin and Hobbes" comic where Calvin takes a photo of a part of his room that is clean, while outside the frame clothes and toys are piled precariously. "Select the facts and you manipulate the truth," Calvin says. That's what journalists do — and it's not necessarily malicious. At *The Tech*, even though we make our best effort to collect all the facts and present them fairly, we miss things.

In the years to come, we'll continue to try harder to improve our coverage, and we want you to help us. If we've missed something, email or call us. If your voice hasn't been heard, or you disagree with something we published, write a letter to the editor. You can even join us — we're always looking for new writers.

But even more importantly, I hope you will think about what is missing. If you seek the truth, do not let us, or anyone else, tell you what you should think. Gather the facts and stories carefully, and develop the filter of your mind so that others do not filter for you, because others may or may not be right, but either way, do you want to cede to them your own reason?

I wish you an auspicious start to the spring semester and bid a fond farewell to the wonderful editors I have worked with throughout the year, and to you, the readers, who have followed our stories and used them to start many thoughtful conversations. We do this all for you.

—Emma Bingham '19
Volume 138 Editor in Chief

ARTS ARTS ARTS

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VIDEO GAME

The first 48 hours of *Dead Cells*

You die a lot

Dead. Again. A glob of green goop oozes back into our corpse (rotting beside an even larger rotting corpse). Our character ambles up and, in a flash of blue, we're alive. Again. And it's back into the breach again, dear friends.

I've spent the last three days after REX dying in Dead Cells, a roguelike, metroidvania (a term I learned researching this game) sidescroller. You play the cheeky glob reanimating prison corpses and slashing through a monster-ridden world. As a roguelike, every death is a restart, and Dead Cells is hard, so you die a lot. And restart. From the beginning. A glob of green goop falling into a corpse. Again and again. But Dead Cells is about restarting over and over. Each run is about getting good for the next run, but restarting is not as frustrating or as repetitive as it may sound.

Dead Cells thrives off its replayability. The same map's twisting corridors and hidden secrets are different each time around, being procedurally generated. While on the rare occasion you're thrown into a map you can't finish, the mutating world makes rediscovery exciting and challenging. You're not merely running through the same map over and over again.

— Jynnie Tang

COURTESY OF MOTION TWIN

MUSICAL

Come to the Fun Home! The Bechdel Funeral Home, that is

Tony-award winning musical *Fun Home* comes to the Boston Center for the Arts

COURTESY OF NILE SCOTT STUDIOS

Death and history loom over the Bechdel funeral home, the historical museum lovingly crafted by its director, Alison's father Bruce Bechdel (Todd Yard), and cared for by her mother, Helen Bechdel (Laura Marie Duncan). The funeral home — affectionately named Fun Home by the children — is the stage set, with painted white eaves hanging from the ceiling and antique furniture and ornamental rugs on the floor. As adult Alison Bechdel (Amy Jo Jackson) illustrates her childhood and college years in her graphic memoir *Fun Home*, she recalls her newfound acceptance after coming out as lesbian in college just as her closeted gay father dies from getting hit by a truck. We know Bruce dies — it's revealed early on in the musical — but that's not the point. It's the circles drawn through and around it that we walk in this musical.

Alison Bechdel explores her father's death in suppositions and half-truths, reads in between the lines of letters and conversations, and draws from slivers of memories: memory is all but what remains of Bruce Bechdel's intellectual, complicated life before his death. We join her on this circular journey, leaping through time over and over, watching Allison growing into herself while Bruce hurtles towards a death that we know is coming but are afraid of anyways.

— Ivy Li

THEATER

The million bright sides of life

Every Brilliant Thing: serious issues, sincere and comic approach

We didn't know how to write this.

We were still in shock after leaving the cozy, arena-style theatre for the imposing wideness of Tremont Street. We'd just watched *Every Brilliant Thing*, a one-woman show written in England by Duncan Macmillan and brought to Boston by SpeakEasy Stage Company. The show follows the journey of a Narrator (Adrianne Krstansky), whose mother's depression and attempted suicides inspire her to create a giant list of every brilliant thing in life.

Of course, "watched" is not the proper term to describe how we interacted with the play. "One-woman show" is also inaccurate — though Krstansky was the only actress on the bill, the spotlight shone on the audience, too. Most of us had lines to read, hand-written on unique scraps of paper. Some members of the audience were called on to improvise, taking on various roles that included the Narrator's father, teacher, and even husband. Often, Krstansky asked audience members for props or apologized when she bumped into someone as she meandered around the bleachers. She sang aloud, and we laughed, as if she was an old, excitable friend, recounting a good story. In the end, we didn't "watch" *Every Brilliant Thing* as much as we experienced it.

— Patricia Gao and Mahi Shafiullah

COURTESY OF SPEAKEASY STAGE COMPANY

CAMPUS LIFE

CAMPUS LIFE IN REVIEW

The Campus Life section aspires to capture the spirit of MIT. This year, the section debuted two new columns: wisdom from Auntie Matter, *The Tech*'s advice columnist, and the Student Spotlight, a feature that highlighted students from across campus.

We also ran such diverse articles as a reflection from a Chinese student who studied abroad at MIT, accounts from students about mock trial and a solar car challenge, and a story about an entrepreneurship competition inside a glass cube.

On the heavier side, we featured an anonymous story of a graduate student's sexual assault and tributes to community members who died, including writing professor William Corbett and alumna JJ Zhao '14.

There are many different kinds of people at MIT, and there are many different paths through the 'Tute. In Campus Life, we love hearing your stories about your MIT — your passions, your whimsy, and your thoughtful reflections. We hope you enjoy this look back at some of the ones you shared with us this past year.

— Emma Bingham '19
Volume 138 Editor In Chief

Student Spotlight

Craig Thorburn '18

Why did you join the Cross Products?

I had never done a cappella before I came here — I'd done a lot of music but not so much singing, bar a couple of things in the choir and a senior year musical. The Cross Products sounded interesting because my faith has always been important to me, and they say that they are a ministry group that happens to sing rather than a singing group that happens to be Christian. We have weekly Bible Studies together, and our setlists are chosen to spread a certain message. Every spring break, we go to someone's hometown and sing in churches, nursing homes, schools, hospitals, homeless shelters... once, we performed at a prison. In sophomore year, we went to Scotland! I'm so glad to have been part of it for four years.

Myra Ahmad '20

What are your plans for the future?

My long term goal is to be a venture capitalist. They're the people who give money to start-ups, usually funded by firms that listen to pitches and decide to invest in ideas they like. In 15.359J (Innovation Engineering: Moving Ideas to Impact), I learned that there is a definite need for more diversity within these teams, due to the simple fact that people tend to invest in people who look and act like themselves. I will be interning at IBM this summer, which hopefully leads to future opportunities. It's a big step away from robotics, but it's important to have a tech background while listening to start-up pitches, while I'll probably satiate my engineering side by filling my garage with cool little gadgets I've made.

Yu-Chien Huang G

How would you summarize your PhD to a layman?

I work on F-theory, a subfield of string theory, under Professor Washington Taylor. There are five types of perturbative string theory. However, we think there may be more of a unified picture. Imagine a blind person touching an elephant. They might touch its trunk and think an elephant looks like a tube. They might touch its leg and think an elephant is like a pillar. They might touch its ear and think elephants are like fans. They would describe an elephant as different things depending on which part they touch. In a similar fashion, we can only probe different limits of string theory and are therefore classifying them as separate. F-theory aims to create new models of Grand Unified Theory.

Sarah Shapiro G

Were there any surprises when you first came to MIT?

I expected the MIT community to be really competitive, but it wasn't, which was cool. The first year in ChemE is notorious for being very difficult, but everyone banded together and were willing to help each other with psets (homework). Also, for ChemE here, you are required to do a minor: three classes that aren't cross-listed with Course 10. For mine, I did some Sloan courses focused on entrepreneurship in developing communities, which aligns nicely with my current research.

Eke Wokocha '20

What's the difference between art and design?

Art is about self expression, but design is the expression of someone else — you have to adapt to fit the situation and carry through someone else's specifications. I think the ACT classes I'm taking alongside architecture allow me to think more freely. For example, my current project involves envisioning an island containing structures that can't be found on earth, such as a 3-D liquid cube. I'm using the same software that Disney uses to create animations, modelling how things on this island interact with each other.

By the numbers

Ten things that tell you that (a Cambridge) spring is coming

It's my second spring in Cambridge, but I already know what to expect: slush everywhere and flowers blooming through it. Here are a few more signs that a true Cambridge spring is upon us:

1. You feel it in your bones...or your nose. To be precise, if you've got allergies like me: You sneeze, your eyes itch, and your nose starts running all for "no reason." It's like I can sense the pollen before it even gets here.
2. People are asking what your spring break plans are. Maybe you should get on booking tickets before they get expensive.
9. The MacGregor wind tunnel isn't synonymous with pain anymore. As a resident of said dorm, I appreciate this one the most.

— Josephine Yu

Nine tips about spending the summer abroad

I spent this past summer in Cambridge, England doing an IROP. From learning differences between British and American English to visiting the hospital, I can definitely say I had a blast. Here are some tips if you ever decide to spend the summer abroad.

1. Learn the language! I spent my summer in England, so I was thankfully spared from a language barrier... except not really. They call "flashlights" "torches," and they call "arugula" "rocket." Imagine my confusion when offered a "rocket salad." Like I said, learn the language.
2. Google Maps is your best friend. Not only does it tell you where it's legal to bike, walk, and drive, it also lets you re-route to include a grocery pitstop on the way home.
3. Don't be shy — meet people! Over the summer, I met PhD students hailing from Switzerland, Austria, and China who all had very different perspectives on life than the classic MIT student.

— Josephine Yu

Ten things you realize after the first month of the school year

It's already one month into the semester, which is about the time that everyone begins to realize that something might not have gone according to plan, or that perhaps things are better than they seem.

1. There isn't always free food lying around. REX, Orientation, and Career Week were, unfortunately, not super representative. Protip: subscribe to freefood@mit.edu for the occasional golden find.
5. Speaking of calendars, you'll likely find that there's one week (or two or three) that's especially bad. Maybe you have a really hard midterm, an important interview, a club event, or some awful combination of all these and more. As much as you dread that hell week, remember that there is always support. Reach out for help when you need it!
7. There are some friends you haven't seen since the semester began, since you've both been so swamped. Time to schedule lunch!

— Josephine Yu

Auntie Matter

Dear Auntie,

Everybody I know on my floor is Course 6. I'm CMS. Everyone on my floor is doing their interviews and getting offers now. I am applying to Course 6 internships, but I'm not sure if I want to do them. The CMS internships are my first choice, but they start letting you apply just as the Course 6 jobs make you decide on their offers. How do I stop being so anxious about this when I know the anxiety is unnecessary?

— Choosing: Media or Software?

Dear CMS,

Why are you applying to Course 6 internships?

Are you worried that you're not going to get a CMS internship? Are they more competitive? If so, it seems sensible to have a fallback. The reasonable course of action in this scenario is to apply to the Course 6 jobs and ask for extensions on accepting offers. If the companies refuse to grant extensions, and you don't get a CMS job, Auntie has heard rumors that there are still software engineering internships to be had in the spring, too. You will get an internship for next summer, never fear.

Are you feeling pressure from seeing floormates get Course 6 internships? If so, Auntie wants you to know that it's okay that you want to do something different from the people on your floor. Auntie herself has experience doing, well, non-Course 6 internships. However, the pressure you feel is understandable. It is oft-repeated, yet true, that Career Fair gives a distorted image of the jobs that are out there, i.e., that the only possible professions are software engineer, trader, and consultant, with NSA codebreaker tossed in for good measure. However, the reality is that there are many people on this planet who are not software engineers, and you could join them.

Here's a mental exercise Auntie likes to conduct: next time you feel like everyone in the world is a Course 6, look around you at the objects in your everyday life. There are lots of things involved in the creation and maintenance of those objects that are not software-engineering related. Take a book of poems, for example. You could be a poet, an editor, a marketer who works at a publishing house, a librarian, a critic who reviews poetry, a font designer, a person who engineers and maintains machines for printing books, a person who improves upon the types of paper or ink used in books, a person who decides how to distribute books, a teacher who teaches the poems in their classroom, a curriculum designer who figures out how to integrate them into a high school English curriculum, an SAT question writer who uses the poems for a section of the exam, and more.

Finally, about your anxiety. Auntie's philosophy on anxiety is that you should worry to a certain extent, but there is a line between paying attention to the things you need to do in a situation and constantly stressing out about what you can't control. It seems like you are taking all the actions you need to in this situation, which itself might be a comfort. You already knew what to do! You'll be fine.

Dear Auntie Matter,

I'm a freshman and this junior and I have really hit it off. He is an exchange student, and he will only be here through the end of the semester. He doesn't have a girlfriend, and it seems pretty clear that he is interested in me. Does the November Rule count in this situation?

— Frosh, Fond of Foreigner

Dear Fond,

Auntie is going to contradict all the typical advice here and say that you should break the November rule. Auntie's loyal fans will know that she is an advocate for seizing opportunities when they arise, especially in dating.

However, there is a caveat. Consider the purpose of the November rule: as many of Auntie's readers understand, the purpose is for frosh to develop their own social circles without the strong pull of an upperclassman with their already-established social circles. Particularly, the November rule guards against the problem of a frosh wholesale adopting the upperclassman's friends as their friends. Should the relationship end, they would subsequently lose both their romantic partner and all of their friends in the process.

Therefore, you, dear writer, should not pursue this relationship to the detriment of forming friendships. Consider gossiping about your hot foreign boyfriend with your floormates, your teammates, or your fellow student group members. Seek romantic advice. Make it a team sport. Or, if that's not your style, cultivate an air of mystery that will fascinate your friends for years to come.

The fact that he is an exchange student is in your favor here, too. You don't say how long he has been at MIT, but Auntie assumes it is significantly less than two years. This means he has had a similar amount of time to make friends as you have, and so the friendship playing field is more level between the two of you.

The main reason Auntie suggests you pursue this man, however, is that she hopes you will fall passionately in love. To be frank, this scenario just sounds ripe with possibility for longing and risk and novelty. Please have a sizzling hot affair with a foreign man. Auntie begs you. (And feel free to write in with details.)

The 2018 InCube Competition

In case you were wondering why people were living in a glass cube in front of Stata

By Jordan Harrod

Have you ever wondered what it would be like to live in a fishbowl?

The weekend of Sept. 21, Paolo Adajar '21, Eswar Anandapadmanaban '19, Sam Solomon '20, Erica Yuen G, and I ate, slept, and worked in a glass cube on North Court for four days. This was the 2018 InCube Competition, an international hackathon/pitch competition led by ETH Zurich Entrepreneur Club. There were five cubes, each with a different challenge from its respective sponsor.

Our challenge, sponsored by Stryker, was to design the ambulance of the future. Over the four days, we met with paramedics from ProEMS, medical directors in the Boston area, engineers and designers from Stryker, and you! If you walked by the cube while we were there, there was a good chance we would come out to see what you thought of our work.

We got some interesting questions over the four days, some of which I'll answer here:

- Is this a reality TV show/social experiment? It's not a reality TV show, but it could definitely be considered a social experiment.
- Where do you go to the bathroom/shower? Stata, using our towel cards in the gym to save packing space.
- Where do you sleep? In the cube — the couches fold out into queen size beds, and the footrest in the middle folds out into a single bed!
- Can you really not leave? We can leave for the bathroom/shower/interviews/taking a break, but we spent the majority of the four days in the cube.
- What about classes? Aren't you going to be behind on psets? Let's not talk about that.

Personally, the idea of living in a glass cube to complete an entrepreneurial challenge intrigued me from the first time I saw a flyer for the competition (as was the free trip to Zurich and Crans-Montana, Switzerland). As a PhD student in Medical Engineering, I think the design process should be open and inclusive, with potential solutions refined using input from engineers, clinicians, and patients alike. This cube was the physical manifestation of that ethos, allowing us to show the public what we were working on in real time, receive input and feedback from a variety of stakeholders, and engage with anyone who happened to be walking by.

We went from more than 200 ideas on Friday to one idea on Monday morning, all while getting a decent amount of sleep on our designer furniture (credit to BoConcept in Cambridge). One member of our team even went on an ambulance shift with paramedics for several hours, just to get an idea of what unseen design or engineering problems exist in real 911 calls for paramedics. A GoPro in the cube recorded most of our experiences, but I think we can all agree that some of that footage will never see the light of day.

On Monday morning, it was time to pitch our idea! You can see our pitch here, but to summarize, we proposed a startup that integrated vital monitoring systems to make it easier for paramedics to take care of patients in-transit. Our pitch was recorded and sent to Zurich, where the four other teams presented their pitches live. After a Q&A session with the judging panel and a reflection on the experiences of the other teams, we were excited to learn that we'd won second place in the competition!

I'm writing this on Wednesday, and I saw the construction crew begin taking down the cube as I walked to Stata this morning. While I am extremely happy to have returned to my mattress at home, seeing the cube being taken down was bittersweet. In such a short time and small space, Erica, Eswar, Paolo, Sam, and I quickly became entrepreneurs and even more quickly became friends. When the cube comes back to MIT next year (fingers crossed), I look forward to seeing what the next set of participants has in store.

Bridging the gap between China and the US: comparative perspectives

A reflection on my exchange semester at MIT

By Adrian Shaowen Wu

I clearly remember my mood during my flight from Beijing to Boston this January, as an exchange student at MIT. As a student from Tsinghua, or "Chinese MIT," I was excited about the coming semester in a school with possibly the best education in the world, and I was curious and a bit worried about what I would see — especially in a time filled with tension between the world's top two economies.

Firstly, the education here was different. Last semester, I went to ESG every week for Christian's Many Interesting Things (MIT) course, and the scenes I witnessed there were just amazing: many times, I saw students making trains, small robots, or other gadgets in the working room and discussing with each other about different topics. In China, we have more courses to learn (for some majors, the graduate courses in MIT are required undergrad courses in Tsinghua), but the trade-off is that if you have more content to learn, you have less time to apply that knowledge.

Secondly, I was amazed by the focus on social innovation and poverty elimination on campus. Living in iHouse, I saw a significant number of brilliant fellow students with deep insights about international development. Poverty alleviation is always a topic of great concern in China… the poverty elimination method is top-down, driven by government policy. So, when I heard the iHousers' thoughts and passions about the grassroots projects, I was impressed. In Tsinghua, we have an "omnipotent" student organization system, led by the university. So, the abundance of excellent grassroots projects (like Middle Eastern Entrepreneurship for Tomorrow) amazed me. The two ways of event organization have their roots in the characters of the two societies — Chinese society focuses more on solidarity and collectivism, while the U.S. prioritizes individualism and independence.

The third reflection is about the major issue of Sino-U.S. relations. During the past nine months, the trade conflict has put great tension on this issue, accompanied by Trump's crazy and insulting tweets, including calling Chinese students in the U.S. "spies." Admittedly, during the semester I've encountered some stereotypes about China which echo U.S. mainstream media coverage (some of which is biased). However, what I noticed more often was that the bilateral relation was not a major concern for most students — rather, the difference of mindset resulting from different cultures is considered not an issue to "solve," but rather a tool to facilitate critical thinking and problem-solving. This notion is vital for the future development of these two countries and deeply impressed me.

Because of graduation requirements, I can only stay in Boston for one semester. But the great friends I made here, the open minds I communicated with, and the creativity and interdisciplinary knowledge I received will stay for a long time. In the future, I welcome you to Tsinghua, to dive deep into the quickly-developing China!

Traversing the Oregon Trail by… solar car?

SEVT and the 2018 American Solar Challenge

By Wendy Trattner

This summer, I drove across the country in a solar-powered car. Yep, never thought I'd say that.

To be specific, my team and I completed a 1,762.7 mile race from Nebraska to Oregon in our homemade solar-powered car, named Flux. We made it from the start to the finish line all on solar power and a single battery charge, and it was no easy feat.

Some background: I am a member of MIT's Solar Electric Vehicle Team… We're a group of 20 or so students whose idea of fun is getting together on weekends to design, build, and test our solar car and then push it (and ourselves) to the limit in a grueling endurance race every two or three years.

The entire solar challenge lasted about 2.5 weeks and was split into three portions: the testing, the qualification track event, and the road race itself…After passing the tests, we got on a race car track with the other teams and competed in the Formula Sun Grand Prix. This final qualifying race required us to complete either 96 laps (200 miles) in one day or 143 laps (300 miles) in two consecutive days to prove that our car could handle sharp turns and run reliably in the road event.

As one of the drivers, I have to say that this part was pretty exciting. I felt like a real race car driver, passing other cars, navigating the shortest path for turns, cranking to high speeds on straightaways, and revving my battery. We finished our required laps on the second day in fourth place and moved on to the nine-day road trip.

Along the Oregon Trail, stopping points were located at national parks and museums, where we camped and went hiking. Some of the highlights included Scott's Bluff and Craters of the Moon, a national dark sky zone where we woke up at 3 a.m. to see shooting stars, the Milky Way, and incredible constellations. We also stopped at random motels and sketchy campgrounds along the way. Scattered throughout endless hours of driving were high-adrenaline encounters with thunderstorms, hail, and high-speed winds. Although the car sustained some scratches and dents from our driver's canopy flying off into the road several times, it survived to finish strong.

Moving forward, we will soon begin designing our next vehicle, which will be faster, more efficient, and more awesome than Flux. We intend to use what we learned at the American Solar Challenge to improve our suspension, braking system, aerodynamics, and weight distribution for a car that is sure to perform well at the next race.

Tell us a story

On MIT Mock Trial

By Lia Hsu-Rodriguez

Tell us a story.

I don't remember much about trying out for MIT Mock Trial. I'm sure there was more to the audition, but the part I remember most clearly is being asked this: "Tell us a two-minute story." At the time, I didn't know why this skill was important enough to request, but now, at the end of our competition season, I think I'm starting understand.

Ultimately, a Mock Trial round comes down to being able to tell the best story. Two competing teams present both sides of a fake court case in front of judges — whether you win or not depends on which witnesses can captivate an audience and convincingly convey their points and which attorneys can best present their facts and adapt the case to fit their needs. After all, the prosecution will always have a very different story than the defense, with each side claiming the other is telling the wrong story.

As I write this, I'm still recovering from this weekend's competition and, boy, was this season a rollercoaster. Over the course of the season, members of our team won a total of 10 Outstanding Attorney and Witness Awards. MIT Mock Trial also earned our first official bid to the National Championship Qualifier, even though this is only our third year of existence. Although we're not going to nationals this year, this bid is proof that we're able to hold our own against the nation's top teams. Really, it can only go up from here.

At our most recent competition, we were also recognized for something that is, in a way, even more important than qualifying for nationals: the sportsmanship award for "civility, justice, and fair play." The other teams in our tournaments (about two dozen) voted for MIT — not once, but twice.

This should give you an idea of how amazing the people of MIT Mock Trial really are. Through marathon practices, long hotel stays, and My Cousin Vinny showings, I got to spend a lot of time with my teammates outside of the courtroom and it was obvious: These people are incredible. They're some of the most crazy, dedicated, passionate storytellers I have ever met.

Every one of us does about a million things outside of Mock Trial, yet we still find time to practice for hours a week to prance around a courtroom. Our coaches, despite being real life adults juggling law school and actual careers in law, find time to trek all the way out to MIT every week because they love doing Mock Trial as much as we do.

My Mock Trial story started five years ago (this year is my first at a collegiate level) and I'm not even close to stopping. You might wonder why, because, like the majority of people on our team, I don't want to go to law school. The members of MIT Mock Trial have many different paths in front of us — medical school, PhD programs, technical fields — and yet we all do and love Mock Trial.

I do Mock Trial because of the adrenaline rush that comes with doing a cross examination and the thrill of taking on an eyewitness's persona. I do Mock Trial because it teaches me how to hold myself in front of an audience, how to think on my feet, and how to be a good storyteller. Sure, my teammates might have different reasons, but I know they'll agree with me on this: At the end of the day, you realize that you do Mock Trial and keep doing Mock Trial because it's what you love doing.

NEWS IN REVIEW

Many of the biggest events of 2018 were not events at all, but heralds of things to come: some exciting, others troubling. The College of Computing is the Institute's first major structural change since 1950, and its addition to MIT's research fabric will shape the way the community — or perhaps, if we give way to hyperbole, the world — approaches the age of artificial intelligence.

When headlines on Saudi Arabia reached national news stands, they made their way into our paper too, from Crown Prince Mohammed bin Salman's campus visit in March to an internal reassessment of MIT's ties with the Kingdom announced in October.

On a more local but no less important stage, administrators are reexamining MIT's beloved undergraduate residential housing system, leaving the future of "mutual selection" uncertain. In all directions, important decisions loom ahead.

While MIT looks towards its future, it also joins the country in continuing to reckon with its past. A summary of findings last February revealed troubling connections between MIT and slavery. Against the background of the #MeToo movement worldwide, CMS/W Professor Junot Díaz was accused of sexual misconduct by several writers; MIT later cleared him in its investigation.

As the edges of the enclosing text box approach, we must arrive at an awkward end — if only to begin the work of penning articles for *The Tech*'s 139th volume. We can't predict what the next year will have in store for us or for you, dear reader, but we hope you continue following along, so that we can all be on the same page.

—Sharon Chao '21
and Jessica Shi '21
Volume 138 News Editors

MIT AND SLAVERY

Feb. 12: President L. Rafael Reif released findings about MIT's connections with slavery in an email to the MIT community. Members of the new MIT and Slavery class the previous semester uncovered the information through their research. Findings included:

MIT founder William Barton Rogers and his wife, Emma, owned six slaves when they lived in Virginia in the 1840s and 1850s.

In 1874, a fourth year political economy class that was required for many students involved the discussion of slave service in the context of division of labor. MIT courses also took students on field excursions to slave labored sites, like mines.

Eleven of the 18 racialized images within the first 30 years of *The Tech* and the first 15 years of Technique depicted black people as waiters. On the cover of the Dec. 30, 1897 issue of *The Tech*, which showed two black waiters conversing with each other, the caption assumed they viewed themselves as "nigger[s]."

2018

$51,832

Feb. 21: Provost Martin Schmidt announced that tuition and fees for the 2018-19 academic year would increase 3.9 percent, from $49,892 to $51,832.

NEW DORM JOINS TIER 1

Mar. 2: After months of renovation, New House became the first non-dining dorm in the Tier 1 category, the most expensive housing option, effective fall 2018.

WHITE NATIONALIST FLIERS

Nov. 1: MIT's Bias Response Team received four reports of fliers with the slogan "It's okay to be white," which has been linked to white nationalist activism, posted near campus.

CONTAMINATED RECYCLING

September–October: The amount of recycling that MIT collected nearly halved over September and October, from 49 percent of total waste to 27 percent, due to lower allowable levels of contamination and stricter enforcement of these levels by China, the main importer of solid waste in the world.

YES ON 3

Nov. 6: Massachusetts voted 'yes' on a ballot question to keep a law that protects transgender individuals' rights in public spaces. Prior to the referendum, a group of students formed MIT Yes on 3 to inform other students and help them register to vote.

The law requires places with separate facilities for males and females (such as bathrooms and locker rooms) to allow anyone to use the facility consistent with their gender identity, which may differ from their sex assigned at birth.

MIT.NANO

Oct. 4: MIT.nano, a facility devoted to nanoscale measurement and engineering, had its grand opening. The building contains roughly 100,000 square feet of laboratory space, making it the largest facility of its kind in the United States.

The building cost approximately $400 million and took 999 days to fully construct.

TECHMART

Sept. 17: TechMart, an at-cost grocery store for students, opened in Walker Memorial. Since the closing of Star Market, a popular, close-to-campus destination for affordable groceries, students had needed an alternative.

As of its opening week, milk at TechMart cost $2.26, an apple cost $0.49, bread cost $1.50, and a carton of eggs cost $1.79.

COLLEGE OF COMPUTING

Oct. 18: Reif announced the creation of a new college at MIT, set to open next September, dedicated to the study of computing and artificial intelligence.

"This new College is our strategic response to a global phenomenon — the ubiquity of computing and the rise of AI."
— President L. Rafael Reif in an email announcing the college

A **$350 million** contribution from Blackstone Group Chairman Stephen A. Schwarzman forms the bulk of the $1 billion commitment, and is tied for the largest individual gift in MIT's history.

"If you think about the five schools as verticals, think about the college as cross-cutting."
— Dean of Engineering Anantha Chandrakasan in an interview with *The Tech*

The College of Computing is expected to create **50 new faculty** positions, including 25 bridge faculty who will hold joint appointments across departments.

"MIT will be where we uncover the secrets of our own intelligence, how it evolved, how it emerges in childhood, and how it continues to develop throughout life."
— Professor Patrick Winston '65 in an email to *The Tech*

A new building of an estimated **150,000 to 160,000** square feet will be built for the college, with an anticipated completion date of 2022. It is expected to replace Building 44.

2019

ROOM ASSIGNMENT PROCESS

Jan. 12: Administrators and student leaders announced a "design exercise" for undergraduate dormitories as part of a process to reexamine and potentially alter the room assignment and move-in procedures.

Earlier in the fall, Nelson sent a draft of the "guiding principles" for the discussions. These included the slogan "we reject rejection" and granting agency in the selection process to both first-year students and upper-level students transferring between dorms.

Designs must satisfy two requirements: upper-level students cannot preference or select which new students live in their community (thus banning "mutual selection"); and new students cannot be forced to move out of the room assigned to them over the summer (thus allowing "squatting").

Four of the undergraduate dorms currently use some variant of mutual selection: Burton Conner, East Campus, MacGregor House, and New House. The remaining six dorms implement either a randomized or preference-based lottery.

Only Maseeh Hall and McCormick Hall have guaranteed squatting for first-year students, which also makes them the only dorms to already fulfill both requirements.

RUSSIAN OLIGARCH

Jan. 15: Radio Free Europe and Radio Liberty reported that in April 2018, MIT removed Russian billionaire Viktor Vekselberg from the MIT Corporation shortly after the U.S. Department of the Treasury designated him as one of the entities responsible for advancing Russia's "malign activities" globally.

DINING PLAN CHANGES

Mar. 8: The DSL released a new set of dining plan options for the upcoming year. Major changes included dining dollars that can be used at retail locations across campus, cheaper, optional meal plans for students not living in dining dormitories, and swipes that can be used at any point during the semester.

BANANA LOUNGE

April: The UA Innovation Committee transformed the Compton Lounge (26-110) into a welcoming study space with free coffee and bananas, a napping area, beanbags, and Legos.

MIT NOT LIABLE FOR STUDENT SUICIDE

May 7: The Massachusetts Supreme Judicial Court ruled that MIT, as well as two professors and an S3 dean, will not be held liable for the 2009 suicide of PhD student Han Nguyen. The decision stated that universities have a special relationship with the student and thus a special duty regarding suicide prevention, but the actions of MIT and of the individuals involved in this case did not fall within the realm of this duty.

USABLE FUSION ENERGY?

Mar. 9: Fifteen years: that's the amount of time MIT researchers and industrial collaborators say they need to achieve the long sought-after dream of usable fusion energy — and in doing so, curb the trajectory of climate change.

To work towards this goal, MIT announced a partnership with Commonwealth Fusion Systems, a newly formed private company with ties to MIT, to work together on a "novel approach to fusion power" that utilizes recent advances in superconductor technology.

UAP MARTIN, VP JIANG

Mar. 23: Alexa Martin '19 and Kathryn Jiang '20 ran unopposed for UA president and vice president, respectively. In an interview with *The Tech* prior to their election, they said that the two most important priorities in their platform were academics and mental health.

ROOFTOP SECURITY

Aug. 29: New cameras, card readers, and alarms were installed on rooftops as part of the campus Roof Access project. Signage clearly announced the presence of the security measures.

"There will always be ways around security — they will just be less safe," an anonymous member of MIT's hacking community told *The Tech*. "No matter what, people will go on roofs."

11-6 MAJOR

May 16: Faculty voted to approve a new Urban Science and Planning with Computer Science major.

The program will require the foundational classes of both Course 6 (such as 6.00 and 6.042) and Course 11 (such as 11.001 and 11.188). Students will then be able to choose from a wide range of classes in both departments.

JUNOT DÍAZ

June 18: MIT found no evidence of misconduct in a review of CMS/W professor Junot Díaz's behavior towards students and staff.

"To date, MIT has not found or received information that would lead us to take any action to restrict Professor Díaz in his role as an MIT faculty member, and we expect him to teach next academic year," a statement from MIT said.

Díaz was accused of inappropriate and abusive behavior by multiple women May 4. Writer Zinzi Clemmons first tweeted that Díaz forcibly kissed her when she was a graduate student at Columbia. Following her tweet, authors Carmen Maria Machado and Monica Byrne SM '05 wrote that Díaz had behaved in a misogynistic and threatening manner towards them.

FIRST FEMALE LOG

September: The Logarhythms, MIT's oldest a cappella group, accepted their first female member, Quinn Brodsky '22. Since the group was founded in 1949, it had been all-male.

SHERYL SANDBERG

June 8: Facebook's chief operating officer spoke at MIT's commencement. "The most difficult problems and the greatest opportunities we have are not technical. They are human," Sandberg said. "In other words, it's not just about technology. It's about people."

P/NR EXPERIMENT

Fall semester: As part of an experiment to foster "a more exploration-focused experience," students in the class of 2022 are able to designate up to three Science, Mathematics, and Engineering (SME) General Institute Requirements as Pass or No Record after their first term.

The setup: The hypothesis is that "increased flexibility to enable major exploration will lead to increased confidence in the initial choice of a major and increased satisfaction with the ultimate major," as well as perhaps greater overall satisfaction with the undergraduate experience, improved academic performance, and reduced stress, according to the experiment proposal.

Vice Chancellor Ian Waitz, who is leading this process, said that he hoped that students would take one or two fewer GIRs in their first year, and use that time to explore their academic interests. Departments are also being encouraged to add exploratory, low-unit classes that have minimal barriers for entry and clarify (or create) roadmaps for their majors.

The class of 2021 serves as the "control group" of the experiment, and the class of 2023 may receive a different "treatment" to compare results.

The results (so far): The number of students taking three or four SME GIRs in their first semester decreased from 76 percent in 2017 to 45 percent this fall, according to class registration data as of Sept. 16. The number of unique classes that first years registered for increased by 10 percent.

The average GPA of the first years slightly rose, and the number of fifth week flags dropped, according to the Office of the Vice Chancellor.

However, student preparedness to choose a major did not see statistically significant change based on survey and interview data the OVC collected from the classes of 2021 and 2022.

SAUDI ARABIAN TIES

Mar. 24: Mohammed bin Salman, the crown prince of Saudi Arabia, visited MIT as one of the stops on his first official tour of the U.S. Aside from limited, after-the-fact official publicity, secrecy and rigid security surrounded Mohammed's visit, which took place at the Media Lab.

"Saudi Arabia and MIT have a longstanding collaborative relationship focused on subjects of mutual interest," Kimberly Allen, director of media relations and deputy director of MIT News, wrote in an email to *The Tech*.

Oct. 15: Reif asked Associate Provost Richard Lester PhD '80, who advises the administration on international activities, to conduct a reassessment of MIT's Institute-level engagements with Saudi Arabia following the murder of journalist and dissident Jamal Khashoggi in the Saudi consulate in Istanbul. The reassessment was announced in a letter to the faculty.

The CIA has since concluded that Mohammed bin Salman ordered the killing of Khashoggi.

Dec. 6: Lester recommended against the termination of any existing engagement with Saudi private or government-funded sponsors and organizations in a report sent to the MIT community.

There is no evidence to suggest that the government and government-backed organizations MIT has relationships with were involved in Khashoggi's murder, the report said, and they are unlikely to have any control over the Saudi government's repressive domestic policies or participation in the Yemeni civil war, two other issues acknowledged in the report.

The report recommended, however, that MIT refrain from "large overseas engagements" in Saudi Arabia until conditions there change significantly from the status quo.

Jan. 15: The comment period for the report has closed, and Lester will summarize the feedback he received. Reif will then make the final decision on how to proceed.

SCIENCE SCIENCE SCIENCE

Machines and medicine

The future of AI in healthcare

By Jordan Harrod and Jocelyn Shen

Artificial intelligence is beginning to cement itself as a useful tool for researchers and engineers alike, and it has the potential to become a new addition to the health professional's toolkit. There are a number of groups at MIT that are exploring the immense potential benefits that artificial intelligence can bring to the healthcare industry. Ranging from diagnostics solutions to making unbiased algorithms, MIT researchers across campus are working to provide new technologies and insights into the future of AI in healthcare.

The Clinical Decision Making group at the MIT Laboratory for Computer Science is one such lab. The group focuses on clinical and biomedical informatics using machine learning methods. Researchers study data taken during a patient's stay in the hospital, such as blood pressure and heart rate. They then use this information to make predictions regarding whether or not a patient may need an intervention or if they are at risk of a certain disease. The group has also done work in natural language processing (NLP) techniques specific to parsing language in medical texts as well as many other applications in intensive care, security, and more. Matthew McDermott, a graduate student in the lab, believes the research will bring the "power of machine learning methods and data science to the clinical and biomedical space."

The Clinical Machine Learning Group, which is part of MIT CSAIL and the Institute for Medical Engineering and Sciences, also hopes to use machine learning to make predictions about a patient's health. One of their aims is to develop algorithms that can be used in any field, from healthcare to autonomous vehicles. Furthermore, they collaborate with clinicians to develop algorithms that enable precision medicine and guide clinical care. For instance, researchers in the lab partner with area hospitals to predict the progression of chronic diseases over years or decades in order to help patients and doctors better manage their condition. David Sontag, who leads the group, described one of his long-term goals as developing an "artificially-intelligent primary care physician."

The Medical Vision Group, led by Polina Golland of CSAIL, takes a different approach to artificial intelligence in healthcare by developing algorithms for medical imaging. The group's current work focuses on using machine vision to analyze how oxygen transport in the placenta affects fetal health, identify different conditions in chest X-rays, and use cardiac magnetic resonance images from pediatric patients with heart defects to aid in surgery planning. Ruizhi Liao, a graduate student in the lab, is working with the Beth Israel Deaconess Medical Center to develop algorithms for assessing heart failure patient status by quantifying pulmonary edema in chest X-rays.

Though AI provides many possibilities to better understand human health, it also presents many challenges. There are a number of barriers that must be overcome in order to deploy any of the models produced in the lab. A particularly difficult issue to tackle relates to data collection and data processing. "There are a lot of price concerns, data is expensive to gather, and data is gathered as a byproduct of treatment… It makes our job more difficult as machine learning scientists," said McDermott of the Clinical Decision Making group.

A collaborative quest

The Media Lab's BeeMe project lets users work together to defeat a self-improving AI

By Jordan Harrod and Joanne Yuan

The MIT Media Lab has long been home to non-sequitur social experiments, engaging the public with anything from creating a tapestry of voters to the world's first psychopath AI. However, this may be one of their most interactive and involved experiments yet. BeeMee was developed by Niccolo Pescetelli, a human psychologist working to understand the dynamics of human collective intelligence, and Dr. Iyad Rahwan, a scientist who leads the Scalable

Cooperation group at the MIT Media Lab. This immersive social event invites Internet users to work together to stop Zookd from succeeding in his mission. They do so by controlling an actor, who has consented to give up their free will for the evening. The mechanism for doing so is a hive mind — participants come up with possibilities for actions and vote on them. The most popular option will be performed by an actor and live-streamed to the participants.

The project draws its inspiration from an intersection of literature, performing arts, gaming, popular culture, and YouTube streaming, and aims to break ground in previously poorly-understood areas of human dynamics and human intelligence research.

BeeMe attempts to demonstrate the dynamics of cooperative human intelligence and the influence of internet anonymity on real-life human dynamics. One of the landmarks of human intelligence at the individual level is the ability to implement long-term plans or goals and execute the necessary steps to achieve them. However, not many people have studied how human intelligence functions when people work in groups — most experiments have been much simpler than BeeMe, with participants working together to count the number of beans in a jar or perform other similarly trivial tasks. As such, Pescetelli took the lead in determining the types of information that should be collected from BeeMe, planning to analyze collective navigation, fine-grained coordinated action, and behavior dynamics.

In an interview with *The Tech* before the event, Pescetelli expected one of three outcomes: the virtual crowd would successfully implement an outlined "action plan," the crowd would defy the mission and collectively decide on a new goal, or there would be little to no planning or coordination of the crowd. One of the dynamics that interested him most was the interaction between the actor and the real world, which would be driven by the desires of the virtual crowd.

More than a thousand people logged onto the event, which began at 11 p.m. on Oct. 31. Two characters were controlled by users: one by the name of Winter and the other by the name of Neuro.

The Tech followed the livestream of Neuro.

During the event, players controlled Neuro to explore their surroundings in MIT, including Lobby 10 and the area near the Student Center. They discovered that Zookd was trying to access the nuclear power facilities. After meeting in the Infinite Corridor, the two characters came to an agreement that they would work together to stop Zookd. When later given the opportunity to betray Winter, players chose to remain loyal and successfully stopped Zookd together.

TESS exoplanet search to start next week

The satellite will launch on a SpaceX rocket

By Sheila Baber

The Transiting Exoplanet Survey Satellite (TESS), an MIT-led NASA mission, is scheduled to launch no earlier than April 16 (6:32 EDT) from the Cape Canaveral Air Force Station on a SpaceX Falcon 9 rocket. When it does, it will begin the latest chapter in the search for new worlds.

Over the course of the next 2 years, TESS will monitor more than 200,000 stars (particularly small ones) across the entire sky by looking for the characteristic dip in brightness of a host star caused by planetary transits. In an interview with *The Tech*, TESS Deputy Science Director and professor of EAPS and Aeronautics and Astronautics Sara Seager likened the transit method to "find[ing] an ant in front of a glaring, glaring searchlight." Smaller stars have a lower energy output, and as a result will give rise to stronger transit signals from small planets. TESS will look for dips in brightness in a patch of stars over a period of 27 days. There are several reasons for the small periods, according to Seager. Smaller stars have smaller habitable zones, and due to Kepler's Third Law, planets within these small habitable zones will have periods of around 10–30 days.

It is important to note, however, that TESS will be looking for planet candidates. Dips in brightness similar to those of exoplanets can be caused by other factors such as spots and interference from other stars. An exoplanet designation will require follow-up teams and confirmation from other telescopes, Seager said.

And while computers will do most of the work in processing the data, human eyes will play a major role in the actual exoplanet finding. According to Seager, "Computers will only do what you tell it to do. And we'll be looking at a lot of the data ourselves. It sounds rather old-fashioned, but the human eye is still really wonderful at pattern recognition. Especially looking for crazy things you might not have expected. That you might not have told your algorithm to search for."

TESS comes from a long line of space- and ground-based telescopes tasked with searching for worlds orbiting stars other than our own. A celebrity in the exoplanet hunting business is the Kepler Space Telescope, which has found thousands of confirmed exoplanets since its launch in 2009. Kepler now operates under the K2 mission.

TESS has had a long history of its own. Conceived over a decade ago by Professor George Ricker of the Kavli Institute, TESS has been rejected from competitions, passed over for other missions, and seen donors come and go. It took winning the NASA Explorer (EX) Class Mission in 2010 for TESS to reach this point.

Professor Seager says that she is "confident" that TESS will launch on the first possible day next week.

Districts and Data

Boston-based researchers use computing power to tackle gerrymandering

By Eli Sanchez

The redistricting process is undertaken after every national census to satisfy a constitutional requirement that each district within a state — or local district within a jurisdiction — be comprised of roughly the same number of people. In theory, this process is meant to prevent communities from losing or gaining influence in elections through the shifting of a state's population. But as was evident in the aftermath of the 2010 census, redistricting is often exploited by partisan bodies for the very opposite: to manipulate the political clout of certain voting blocs to influence the outcomes of elections. And though this practice has been most notably employed by the Republican Party in recent years, Democrats have also used it in the past and may again soon if a "blue wave" materializes in the 2020 elections.

This opportunistic use of the redistricting process — commonly known as gerrymandering — is widely reviled as one of the most undemocratic practices employed in American politics. It has been leveraged throughout U.S. history to establish advantages for political parties, protect incumbents, and marginalize or empower certain demographics, and is often implicated as the root of many of our political system's ills, such as congressional gridlock, runaway elections, and ideological extremism in government.

But despite many hard-fought court cases to challenge it, this undemocratic practice persists with seeming impunity. Now, however, researchers throughout the country are starting to develop promising techniques for tackling this issue, and there are already early signs that their efforts are paying off.

Justin Solomon, Principal Investigator of the Geometric Data Processing Group at MIT, is a prominent member of the Metric Geometry and Gerrymandering Group (MGGG), a cohort of Boston-based computer scientists and mathematicians, founded by Professor Moon Duchin at Tufts University, that are leveraging modern computing power to study the problem of fairness in redistricting with a level of quantitative rigor that has not been possible until recently.

"From my perspective, one of the big challenges in redistricting is that we lack clear, quantitative standards for evaluating the fairness of redistricting plans" said Solomon. "For that reason, there's no clear path to a standard that's easily enforceable and understandable."

"Our effort, broadly, is… to assemble a clear set of standards and a way to talk about the redistricting problem in a fashion that's quantitative and that's fair and easy to apply," he told *The Tech*. "That includes a lot of different aspects. Everything from understanding the shape of a district and what bearing it has on the outcome of the vote… to understanding the big space of all the different ways of dividing up a state."

To date, most attempts to contest partisan gerrymanders in court have failed due to the lack of a clear, convincing standard against which to judge them. But Solomon's work, and that of his colleagues in the MGGG holds the potential to fundamentally reshape the debate around gerrymandering by offering a feasible means of formulating and implementing such a standard for the first time in U.S. history.

Previous work by Solomon involved evaluating the utility of various compactness scores, metrics designed to quantify how "weirdly-shaped" a district is. Some examples of compactness scores include the Reock score: the ratio of a district's area to the area of the smallest circle that completely encloses it, and the Convex Hull score: the ratio of a district's area to the area of the smallest convex polygon into which it fits.

But a district's compactness doesn't tell the whole story. "The reality is these districts are designed with so many different criteria in mind," Solomon explained. "One is the shape. Others include compliance with civil rights law… [T]here are plenty of districts that really were designed quite carefully to give a particular minority a voice, in which case maybe you needed a crazy shape to pull that off."

Reliable and convincing metrics for quantifying the fairness of redistricting plans must be able to accurately account for a host of complex and interrelated factors. Formulating these metrics remains a thorny, open problem for Solomon and the MGGG. But even once they've identified metrics that are legally practicable, they will have to work out feasible methods for implementing them, a problem that is far from trivial.

SCIENCE SCIENCE SCIENCE

OPINION OPINION OPINION

GUEST COLUMN

Where is the humor in hunger?

When an April Fool's joke goes too far

By Miranda McClellan

On April Fool's Day, an email from the Class of 2018 Class Council mocked the results of the recent report on campus food security. The email read: "The recently published food insecurity report identified a dietary need in a risk group common to MIT: summer interns at large technology corporations... these students, who do not wake up early enough to make 10 a.m. breakfast, are getting by on just two free meals a day — lunch and dinner.

As such, Senior Class Council, in conjunction with the UA, will be funding a travel grant fund for this risk group by redirecting the funds from the Senior Ball food budget. ...this money will allow us to implement a similar program in Silicon Valley so any student can get to their favorite Sheryl Sandberg-approved $$$$ restaurant..."

According to the mentioned report by the Food Insecurity Solutions Working Group, up to 13 percent of MIT undergraduates struggle with food insecurity in addition to the stress of coursework and research common to the MIT experience. The 2018 Class Council's email displayed a substantial disregard for these students. This lack of empathy is especially concerning because it was broadcasted over a class-wide email from the group of people that have been tasked with representing the interests of their peers. Even though I do not suffer from hunger, I was shocked by the council's lack of regard for the gravity of food insecurity and the fact that the council was comfortable publicly mocking the issue of campus hunger over a class-wide email. In the same way that sexist and racist jokes are not funny, the ongoing campus hunger issue is a serious matter that is never appropriate to joke about. There are many topics that could have been appropriate for an April Fool's prank, but the council chose instead to mock their peers who can't eat. Why not joke about our lovely spring weather, seniors who have to take final exams, or confusion over filing taxes instead? The 2018 Class Council showed a fundamental lack of understanding of the challenges that their peers face, especially in light of recent rises in tuition, housing, and dining plan costs.

Further, the 2018 Class Council's email encourages dangerous myths about poor people that are common in U.S. culture. The email implies that students struggling with food insecurity are too unmotivated to wake up, that they deliberately attempt to game the system to get expensive food for free, and that they are lying about their experience of food insecurity when they actually receive abundant free meals. The myths portrayed in the email parallel those that permeate broader American culture: poor people are often depicted as lazily sitting back to collect government checks, making poor choices or being too picky with opportunities, and lying about their lived experiences to gain food stamps for luxury.

The insensitive nature of the joke is amplified by the fact that this is a very expensive time of year for seniors: families must pay to travel to graduation and book hotels, and students must pay additional costs to attend popular events, with Senior Ball tickets originally advertised at $50 each and Senior Week events costing up to $120. Budgeting for senior expenses is stressful enough for low-income students without ill humor at their expense. The 2018 Class Council's email further alienates low-income students during what should be a time of celebration for our class. Bad jokes like this are part of a structure of power that make low-income students feel unwelcome or burdensome, when in reality, they are our pset buddies, our hallmates, and our dear friends who should be supported through difficulties like hunger.

LETTER TO THE EDITOR

Talking about the Israeli-Palestinian conflict

Understanding the Israeli-Palestinian conflict is not easy. It requires learning about various narratives, carefully engaging with Israel's history, and thinking about the hard challenges faced by Jews, Palestinians, Bedouins, Christians, and Druze. Conversations about Israel on college campuses, in the United States, and most importantly in the Middle East need to be nuanced, thoughtful, and done with care.

Unfortunately, the wall that was stationed outside the Stratton Student Center throughout the week of April 22, 2018 did not provide a careful and productive way to engage with the Israeli-Palestinian conflict. It instead presented a one-sided view, selected facts, lacked context and used provocative and offensive imagery. For example, the mural failed to mention that the wall was built as a security measure in response to hundreds of Israelis that were murdered during the Second Intifada in 2000. Since the wall was built, terror attacks have declined by more than 90 percent, and the death toll of Israeli civilians from terror attacks has decreased significantly.

As another example, the mural referred to Gaza as an "Open-Air Prison." It did not mention that Gaza has a 12-kilometer-long border with Egypt or that Israel sends tons of goods to Gaza. Unfortunately, some of these goods have been used to build at least 15 terror tunnels leading into Israel that have put both civilians in Israel and in Gaza at risk. The mural also did not mention that Israel withdrew from Gaza in 2005 and that Hamas was elected to govern this area by the Palestinians. The leader of Hamas, Ismail Haniyeh, was recently designated by the U.S. State Department as a terrorist. Since January 2012, more than 2,604 rockets and mortars fired from Gaza have hit Israeli civilian areas, and rockets have even been found in a UNRWA school twice (the UNRWA is a United Nations agency established in 1949 to provide assistance and protection to Palestinian refugees).

We wholeheartedly encourage people to express their opinions regarding the Israeli-Palestinian conflict. However, if the intention is to have a meaningful, constructive conversation between Israelis and Palestinians, it is important to present the full picture. Failing to do so is damaging for everyone. It only causes more hurt and divisiveness and unfortunately encourages radicalism on both sides. It is crucial for our actions and conversation about Israel to be fact and context based, educated, and levelheaded. We should acknowledge and address difficulties on both sides and engage in debate to one day build a better future for both Israelis and Palestinians.

— Keren Starobinski and Judith Fusman

EDITORIAL

The hypocrisy in MIT's moralizing

MIT's silence on war and exploitation reveals that convenience is central to its ethics

The Yemen crisis has been dubbed by Amnesty International "the forgotten war," so perhaps it is fitting that MIT conveniently experienced some amnesia regarding Saudi-led injustices as it leapt at the chance to build high-profile, and likely profitable, connections with a foreign power. This most recent controversy surrounding MIT fits a foul pattern which has come into relief in an era featuring increased emphasis on morality and social duty: the MIT administration has reliably commented on political matters when it is easy to do so, but it has strategically chosen to remain silent on matters of injustice for which it shares culpability.

The administration has made clear its support of DACA students, ensured that high school students could peacefully protest without jeopardizing their chances of admission, spoken out against President Trump's early-2017 travel ban on seven Muslim-majority countries, and criticized the white supremacist rally in Charlottesville, VA. Yet, in the case of MBS's visit, MIT has not publicly justified its decision to hold this forum in the face of the online petition or in-person protest, instead only publishing a news article praising the potential of the forum to expand Saudi Arabia's economy. Many people have speculated that MBS is using his trip to the U.S. to rebrand himself as a positive, transformative force for Saudi Arabia and consequently pave over his human rights violations. By holding this forum and further developing its relationship with Saudi Arabia, the MIT administration is sending the signal that it not only approves of MBS's rebranding mission, but it is even willing to actively participate in it. The administration is demonstrating that it is open to building relationships that empower war criminals, as long as it can expand its global influence in the meantime.

The MIT-Saudi relationship itself is far from new. One of the MIT Energy Initiative's co-founders and member companies (companies which provide the initiative with its funding) is the Saudi Arabian nationally-owned oil company Saudi Aramco. Further, MBS's non-profit foundation MiSK recently became a member company of the MIT Media Lab, a title which requires a minimum $250,000 donation per year.

Both of these partnerships raise questions about potential financial motives that MIT may have in building a relationship with Saudi Arabia. While it is obviously necessary for MIT to find its funding somewhere, it must also come to terms with the fact that accepting funding from foreign leaders or businesses with questionable economic and political goals inherently means that it is at least somewhat bound to these questionable goals as well. This financial linkage could very well explain MIT's willingness to help Saudi Arabia develop its economy in spite of the country's human rights violations, as well as its convenient silence in response to student criticisms of this growing relationship.

However, the veil of silence surrounding MIT's controversial relationships goes further than just Saudi Arabia. Although news organizations churn out frequent stories on U.S. war crimes in the Middle East (between 737 and 1,551 civilians have been killed by U.S. drone strikes in Pakistan, Afghanistan, Yemen and Somalia), the Institute actively works to support this rampant militarism through the MIT Lincoln Laboratory, a U.S. Department of Defense research center that operates on a billion-dollar budget to develop military technology. The website for the Office of the President contains documentation of President Reif's letters to the community, op-eds, and speeches, and it seems to indicate that Reif has released numerous statements praising MIT's military contributions for serving the national interest, but none recognizing their ability to inflict harm on civilians. For example, a March 2017 letter to the community regarding federal research funding contained a link to a congressional testimony by Vice President of Research and National Science Board chair Maria Zuber, which begins by praising the role of MIT's physics research in developing the atomic bombs that arguably facilitated the Allied victory of World War II. Regardless of whether or not this research ultimately played a positive role in the war, it would be disingenuous for MIT to claim credit for aiding in the victory without acknowledging the detrimental and lasting effects that Japan has faced as a result of the nuclear bombing. In the same way that MIT and other universities are now working to explicitly acknowledge their histories with slavery, they should also work to explicitly acknowledge their contributions to human suffering in international conflicts.

LETTER TO THE EDITOR

President Reif responds to editorial on MIT's moralizing

As a starting point, we strongly favor a strategy of engaging with the world, and of opening the doors to collaboration. However, favoring engagement sometimes requires wrestling with complex choices, as when we are invited to work on subjects of important shared interest by parties whose values and actions in other areas we reject. In each case, and repeatedly over time, we make our best assessment and form a judgment: By engaging, do we see a significant opportunity to do some good or drive some progress, in areas that matter to our faculty and students?

If yes, we seek to work out a carefully focused relationship. In the Saudi case, over time this path has led to Saudi Aramco's sustained support for MITEI's renewable energy research, and to the Ibn Khaldun fellowship, which has already brought 27 Saudi women PhDs to our campus and which the signing at the recent forum extended for a decade.

We could instead choose a strategy of refusing to engage. In most instances, however, it appears to us that our not engaging neither creates nor encourages significant positive change. I recognize that, in each case, this is a matter of judgment. These decisions are rarely clear cut. Members of our community may disagree, in general or in certain cases, or may conclude that particular relationships are unacceptable to them. I certainly understand such positions.

Your editorial also suggested that when I write to the community on matters of public policy, I have chosen subjects that were easy to speak up on. Since they have not felt that way to me, I would like to briefly describe why I have taken such public stands.

MIT is an American institution with a mission of national service and a long record of constructive partnership with the US government. Therefore, federal policy changes that threaten our mission or members of our community come as a shock. In my judgment, they require an urgent institutional response, and part of marshalling that response is making sure that our community understands the threat and what we plan to do about it. For a research-intensive university that receives 67% of its campus research funding from the federal government, publicly criticizing federal policy carries real risks. In each case – the travel ban, the withdrawal from the global climate accord, DACA, the changes to the tax code that threatened our graduate students and our endowment – my goal was not to scold, nor to score moral points, but to take a stand in defense of our community and its mission. But I'm prepared to hear that I did not get the balance right.

Making a better world is a grand aspiration. I believe we should aim that high – and that living up to that mission means seizing opportunities to do the most good we can. Yet defining what that means in practice clearly leaves room for serious discussion and a wide range of views. I'm grateful to hear your perspective, and I appreciate the opportunity to explain our approach.

— L. Rafael Reif

FEATURES IN REVIEW

This year *The Tech* revived its features section, broadening the scope of its reporting to further examine MIT institutions and cover the personal stories of those on campus. With our new "Explained" series, we dived into the what and how of the MIT Corporation and the MIT budgetary process. In this age of #MeToo we reflected on MIT's third annual Title IX report — prescient, as merely weeks later the Department of Education proposed new Title IX policies. Following the Trump Administration's declaration to rescind DACA and the ensuing court battles, Dreamers discussed their stories and their hopes and fears for their futures at MIT and beyond. The local community enjoyed hearing about the Concourse team's work with restoring the Kendall T station's musical installation; coverage of their work reached #2 on r/Boston. We thank you, dear readers, whether in print or on Reddit, for sharing the excitement of this year with us, and hope you stay along for the next.

— Whitney Zhang '21
Volume 138 Features Editor

Reflecting on MIT's third annual Title IX report

Most reported misconduct involves undergrads, most reported harassment involves faculty or staff

By Mark Goldman

The release of the Title IX reports each year shows MIT's commitment to both reducing gender-based violence and increasing transparency. [In this report, MIT releases aggregated, anonymized data about the outcomes of formal investigations involving students in its Title IX cases.]

Taking a deeper look into the reported data, including the most recent Title IX report released last month, with respect to MIT and peer institutions' initiatives, highlights the impact of some of MIT's efforts and what we can do going forward.

MIT does not report aggregate data about investigation outcomes involving faculty/staff.

From the three years of data, most cases of sexual misconduct, which include sexual assault, involve undergraduates, with non-affiliates making up the second largest group. Over half of sexual harassment reports were based on complaints about faculty/staff. When formal investigations have found a student responsible, MIT responds most severely to students who are found responsible for non-consensual sexual penetration, with four out of five students expelled, based on the most recent report. MIT does not report aggregate data about investigation outcomes involving faculty/staff, despite the fact that peer institutions report it and that a consensus report of The National Academies recommends it.

When *The Tech* asked HR about data availability of faculty/staff investigations, HR mentioned that the leaders of these offices would be proposing updates this academic year but did not explicitly mention any public data availability.

"It's incredibly important ... that MIT continuously reaffirms its support for those who have faced sexual misconduct and/or acts of bias."

In an email to *The Tech*, [Advocacy Chair of Graduate Women at MIT] Sarah Goodman wrote, "It's incredibly important, especially in the current political climate, that MIT continuously reaffirms its support for those who have faced sexual misconduct and/or acts of bias." She concluded, "It's hard to look at these numbers knowing that they represent some of the worst experiences of members of our community, but by becoming equipped with this knowledge, we can work towards creating a safe campus for everyone."

The opinions expressed by Sarah Goodman are her personal opinions and do not represent the opinions of Graduate Women at MIT as a whole.

Data in Title IX Reports

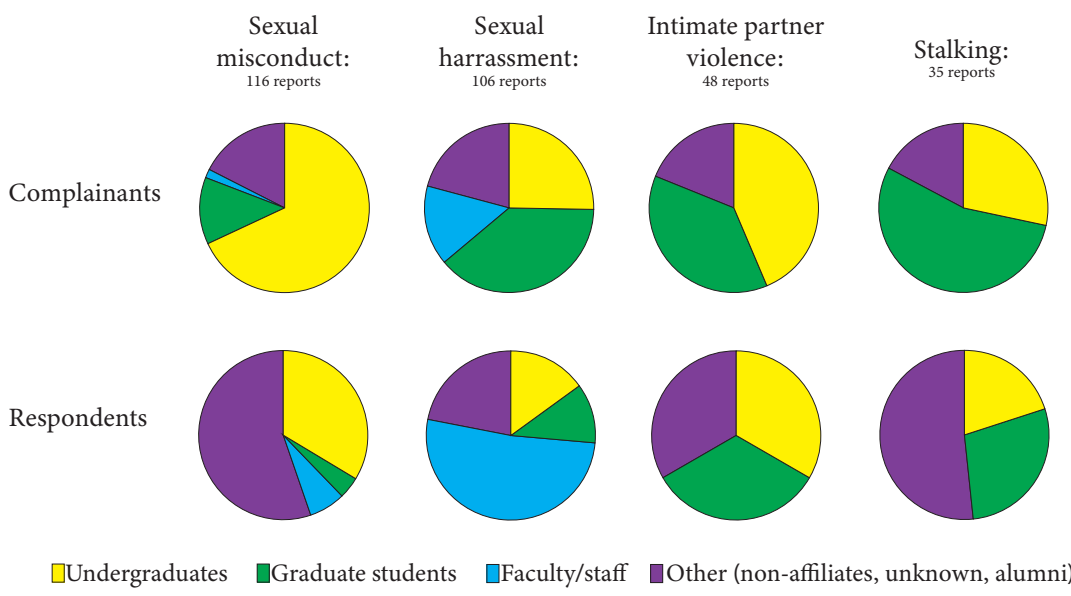
Aspect of report	MIT	Yale	Harvard	Princeton	Stanford	Brown
Affiliation	✓	✓	✓	✓	✓	
Separates faculty and staff		✓	✓	✓	✓	
Separates postdocs and staff		✓			✓	
Type of sexual misconduct	✓	✓	✓	✓	✓	✓
Student disciplinary outcomes	✓	✓		✓	✓	✓
Faculty disciplinary outcomes		✓		✓	✓	✓
Gender		✓	✓		✓	
Sexual orientation			✓			
Retaliation		✓		✓	✓	✓

JOANNA LIN — THE TECH

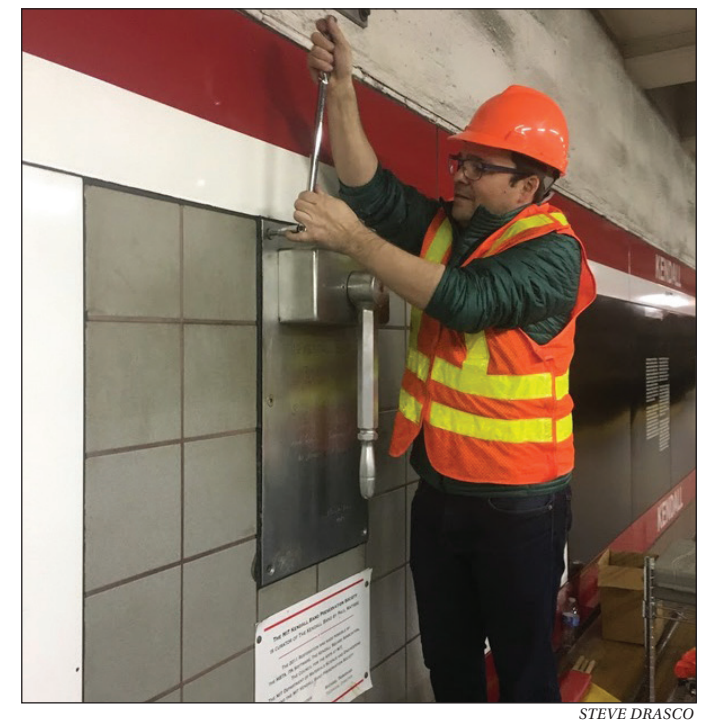
STEVE DRASCO

Carlos Sendao '20 (left) and Maxine "Max" Beeman '20 (right).

2016–2018 Person Categories



JOANNA LIN — THE TECH



STEVE DRASCO

Steve Drasco with one of Pythagoras's levers.

Dreamers face uncertain futures despite temporary protection

MIT provides support services and advocacy for DACA protected students

By Whitney Zhang

Recently, *The Tech* corresponded over email with Ian Bouche '21 and interviewed Jose Gomez '17, Johan Villanueva '20, and Avital Vainberg '21, all Dreamers, to discuss the effect of DACA and MIT's response to its planned rescission on their lives.

A "weight on my shoulders"

At the age of two, Bouche came with his parents to the U.S. from Buenos Aires, Argentina to escape the Argentine economic crisis. Bouche and his family lived in Puerto Rico under a business visa for his father's company. Then, in 2007, his father traveled to Argentina and found upon return that his visa was no longer valid.

Bouche's family tried to renew their visa, but unlike previous years, his father's company was required to make at least one million dollars per year. Unable to meet that quota, Bouche's family continued as undocumented immigrants.

> **"The introduction of DACA ... [lifted a] weight on my shoulders."**

"The introduction of DACA gave my sister and [me] — both essentially raised in America — lots of breathing room while the visa situation got resolved" and lifted a "weight on my shoulders," Bouche said.

Bouche recalls his parents calling him when Trump declared DACA's rescission, and feeling that weight return to his shoulders. Bouche said that as a result, "There's more stress around my family as we try to prepare for the worst" and he feels less "apt as an applicant for jobs and internships."

But, the worst part he says, is the uncertainty: "I just want to know what's going to happen already."

In search of "a normal experience"

At five years old, Gomez immigrated with his parents from Nuevo León, a state in northern Mexico, to McAllen, Texas, where he lived until he was 18 years old.

Gomez explained that because of the proximity to the border, border patrol had a widespread presence in McAllen. Therefore, even with the high numbers of Hispanic and undocumented people, Gomez had to guard himself from everyone around him and always have "in the back of [his] head" a wariness of border patrol.

Gomez grew up poor, but said that he "made the most of it." By freshman year of high school, he knew he wanted to be an engineer, and by sophomore year, he was dreaming of attending MIT. However, as an undocumented student, Gomez had extra barriers to applying for college. Since McAllen is inside an interior checkpoint, a checkpoint within the U.S. where motorists are stopped and required to verify their residential status, Gomez could not travel far beyond his hometown to attend college. Gomez also had extra concerns about paying for school, as undocumented students cannot apply for FAFSA or many other scholarships.

Luckily, DACA was instituted in Gomez's junior summer, and opened for him the opportunity to enroll in MIT's Class of 2017 — the first class after MIT changed its policy to accept undocumented students.

Gomez said that DACA was critical to his having "a normal experience at MIT," where, like other students, he could UROP and intern. At one point, he said he even considered doing MISTI after he received Advanced Parole, which allows Dreamers to leave the U.S. without losing their DACA status.

> **Gomez said that DACA was critical to his having "a normal experience at MIT."**

The blocked rescission of DACA has continued to allow Gomez to work as an applications engineer at a local robotics startup.

A conflicted identity

Villanueva's father first came to the U.S. from Colombia. Then, when Villanueva was one year old, he and his mother flew to Chicago to join his father. They overstayed their tourist visa and have since been residing in the U.S., where Villanueva attended Chicago's public schools.

Villanueva received his DACA status in high school, soon after its enactment. Villanueva explained that it "opened doors" for him by allowing him to legally work and have other "formalities" like a social security number and state ID.

At MIT, Villanueva has been open about his status as a Dreamer, freely discussing it in dorm lounges and with his friends. He said he hasn't felt much backlash here but has been disappointed by the ignorance of some members of the MIT community. For example, he said he is often asked questions like, "Hey, why don't you get your citizenship?" and has to explain that Dreamers are legally restricted from doing so.

Even with the temporary security of the court blocks, the lack of a path to citizenship has made it hard for Villanueva to feel he has an American identity — he prefers to identify as Colombian and Chicagoan. He said, "It's hard to think about what you are when [anti-immigration advocates tell] you you're not that. I've been feeling very conflicted. ... [A path to citizenship] would make me feel prouder, more confident."

Finding community

Vainberg, of strong Orthodox Jewish heritage, came to the U.S. from Israel when she was one and a half years old as a result of family issues. Like Villanueva, Vainberg overstayed her visa. Before coming to MIT, she attended a private Jewish school. She has continued her strong involvement with the Jewish community through Hillel, a Jewish on-campus organization.

> **The lack of a path to citizenship has made it hard for Villanueva to feel he has an American identity.**

Vainberg said that DACA allowed her to continue living her life as a regular teenager — like her friends, she could drive and obtain a part-time job. She recalled that for her "sweet 16," her grandparents called her from Israel and asked what she wanted the most for her birthday. When they told her they would get her a driving permit, she was skeptical, since New York did not allow undocumented people to drive. Her grandparents then said that they would pay the fee for her DACA application (currently $465), and Vainberg broke into tears.

DACA also allowed Vainberg to take a gap year and, through Advanced Parole, travel to Israel, an experience she describes as "incredible" and "amazing," especially because most of her Orthodox Jewish community travels to Israel. During her trip, she was able to meet her extended family, including her very elderly great-grandparents.

While she was there, however, Trump was elected and declared DACA's rescission. Vainberg feared that she would not be allowed to return to the U.S. Fortunately, she was able to, but found that her DACA status expired five days after Trump's declared renewal window, causing her to then fear that she would again be undocumented and unable to work over the summer. Luckily, the court cases have since re-opened DACA status renewals, and Vainberg was able to renew her status over IAP.

During her time at MIT, Vainberg has been proactive in educating the Hillel community here and has invited some friends from Harvard's Hillel community as well. While many community members were initially surprised, she said that they have been very supportive and willing to learn more about her situation.

Like Villanueva, Vainberg struggles with her American identity. She says she grew up American and everyone in Israel told her, "You're so American!" But, at the same time, she says all of the complicated procedures — going around to government offices, getting fingerprinted — to retain her DACA status make her feel like the U.S. government is constantly telling her, "You're not American, you remember that!"

MIT's budgetary process

A look at the budgetary process, history, and current trends

By Avichal Goel

The budgetary process involves allocating billions of dollars in revenue to various operations at MIT, including instruction, research, and administration. The process for this year started in the early fall and will conclude in the winter when final budgets are approved for the 2019–2020 academic year. Determining how MIT's money is spent requires the combined effort and careful decisions of everyone involved.

> **"We have very diverse needs, so [we] have to figure out [how to] decide what's more important."**

In 2018, MIT's operating revenue totaled over $3.62 billion, with large portions coming from research, investments, and tuition. MIT's operating expenses of over $3.57 billion used 98.6 percent of the revenue, up from 97.5 percent in 2017 and 94.1 percent on average over the past 10 years.

Balancing needs in the budgetary process

In order to decide each year's budget allocations, the Office of the Vice President for Finance (VPF) looks at projected expenses, including salaries and financial aid, and compares this to revenue estimates, incorporating factors such as the growth of the endowment.

In an interview with *The Tech*, Provost Martin Schmidt PhD '88 explained that in years when the projected revenue exceeds projected expenses, the Institute has the ability to make new investments and must determine how to spend this extra money. The process to determine this follows a hierarchical structure: each department prioritizes its own needs and then talks to their Dean — for example, each department in the School of Engineering talks to the Dean of Engineering — and each of the deans meet with the provost, who must balance priorities across each of the schools. Finally, the provost talks to the chancellor to incorporate other pressing concerns, which may include matters like the need for more competitive financial aid packages.

In addition to receiving additional budget allocations, individual departments can pursue other methods to acquire funds. In particular, they can write grant proposals to foundations and reach out to friends of the department for donations. In 2018, gifts and bequests for current use accounted for $220 million in revenue, compared to over $1.7 billion in total research revenue. Finally, in the case where departments are unable to secure additional funds, they can choose to reallocate by moving resources from a less important area to the one currently being considered.

Figuring out how to allocate funds and balance needs can be difficult, and there are times when the decision isn't clear-cut. Schmidt said, "You have to have honest conversations with everybody and really try to get a sense of how painful [it is] ... sometimes what we try and do, to see how big of a deal is this for you, is we cost you. If you're willing to take what is your discretionary funds and put it on the table, then I'll do some matching, because I know it's important to you." In such cases, the result can be a combination of department funds and additional support from the budget.

> **"The percent of [research revenue] that is federal research was quite large, and it's been slowly declining."**

When looking at the process as a whole, the hardest decisions to make are the ones that involve trade-offs. Schmidt explained, "We have very diverse needs, so [we] have to figure out [how to] decide what's more important: a microscope in a chemistry lab or another counselor in S^3."

Revenue shifts and the growth of the endowment

As a percentage of the total campus revenue, contributions from various sources have remained about the same; however, the percentage of research revenue has declined and support from investments has increased.

The decline in research revenue can be explained, in part, by the change in composition between federal and non-federal funding. According to Schmidt, "The percent of [research revenue] that is federal research was quite large, and it's been slowly declining ... the percentage of [research revenue] that is non-federal, either foundations, foreign governments, or industry, has grown." On a broader scale, the U.S. federal budget for research and development has declined from over 1.2 percent of GDP in 1976 to under 0.8 percent in recent years.

On the other hand, the increase in support from investments can be attributed to the significant growth of the endowment. As of 2018, MIT has the fifth largest university endowment in the U.S. at $16.4 billion. A large portion of the increase in endowment net assets comes from appreciation, which totalled just over $2 billion this year. Schmidt explained, "[MIT] moved into a different financial peer group than [it was in] back in 1981 ... This peer group is Harvard, Yale, Princeton, Stanford, [as compared to] RPI, Lehigh, [and] Carnegie-Mellon."

Deferred maintenance and the budgetary focus

During the past decade, there have been a few particular areas of focus in terms of the budget and investments. Schmidt described, "In 2008, we went through a comprehensive review of the condition of the physical campus ... we went across the campus into every building and tried to figure out, 'if I had to fix all those things ... how much money would that cost?'" The total cost to fix these problems — including broken elevators and outdated electrical systems — came to a grand total of over $2 billion, in comparison to the $20 million per year that was being allocated at the time. Schmidt continued, "in 2010, we made a major commitment to the the Institute to address the deferred maintenance, and so basically, we took what was $20 million a year of spending on campus and we increased it to $200 million a year, so over a 10-year period, we will spend $2 billion."

> **The recent budgetary focus has also included significant increases to student financial aid, student support, and research funding.**

The recent budgetary focus has also included significant increases to student financial aid, student support, and research funding. For example, the focus on financial aid has allowed the average tuition for undergraduates receiving financial aid to be $23,539 for the 2018–2019 school year, with over 30 percent of all undergraduate students attending tuition-free.

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